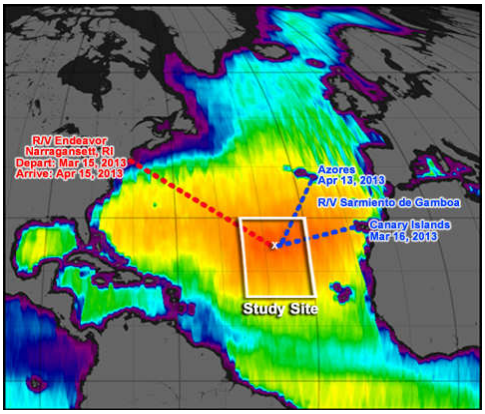
Salinity Processes in the Upper Ocean Regional Study (SPURS)

R/V Endeavor --------

Dates: March 16 - April 13
Total Cruise Time: 32 days at sea
Distances: 3,900nm round-trip from Narragansett, Rhode Island to SPURS site (24°34.9' N,38°0' W).

The SPURS expedition team will depart from Narragansett, Rhode Island on the Research Vessel Endeavor on March 15th for a return visit to the SPURS study site located off the coast of Africa. Scientists on this cruise will spend the majority of their time servicing moorings and replacing and/or retrieving equipment deployed during the Fall 2012 SPURS cruise. The Endeavor will also meet up with the R/V Sarmiento at the SPURS site to conduct water profiling and turbulence measurements as well as deploy a second mid-layer drifter.

Click here to see highlights from the September 2012 cruise!



Map of cruise tracks to and from the SPURS sampling site (R/V Endeavor and R/V Sarmiento de Gamboa pictured). Warm colors (red-orange) represent high-salinity areas while cool colors (blue) represent lower-salinity areas. The white box shows SPURS sampling area.

R/V Sarmiento de Gamboa --------

Dates: March 16 - April 17
Total Cruise Time: 32 days at sea
Distances: 1,213nm from Las Palmas de Gran Canaria to SPURS site (24°34.9' N, 38°0' W). 971nm from SPURS site to Ponta Delgada, Azores

On March 16, the SPURS-MIDAS expedition team will depart from Las Palmas de Gran Canaria and make their way to the SPURS study site on-board the Research Vessel Sarmiento de Gamboa. This cruise will include mesoscale (spatial scales of 100km and smaller) and submesoscale (processes occurring within the first kilometer of the ocean) experimentation with a variety of oceanographic equipment as well as the deployment of 48 surface salinity drifters in a 15 nautical mile grid around the WHOI mooring, set in place during the Fall 2012 SPURS cruise

R/V Endeavor Cruise Details

While steaming to SPURS study site, scientists aboard the Endeavor will measure temperature, salinity, and water current velocities of near surface waters using a TSG (**t**hermo**s**alino**g**raph) and ADCP (**A**coustic **D**oppler **C**urrent **P**rofiler). They will also begin test stations for CTD (**C**onductivity, Temperature and **D**epth), UW-CTD (Under-Way CTD) and VMP (**V**ertical **M**icrostructure **P**rofiler) in order to ensure that all instruments are in working order.

Leg 1 (March 22-25)
Upon arrival to the SPURS site, the WHOI flux mooring will need to be serviced to replace worn line and affix a new anchor. T-Gliders are to be launched for microstructure measurements (variations in temperature, salinity, and velocity) and the NOAA Prawler (Profiler + Crawler) Mooring will be serviced to replace the current Prawler with a PICO 3000 (**P**latform & **I**nstrumentation for **C**ontinuous **O**bservations). The existing Prawler Mooring has gone adrift, so an attempt will be made to retrieve it. While in the study site, three SeaGliders will be retrieved and replacements deployed with a CTD cast at the time of launch. This is also the time when a series of Wave Gliders as well as T-Gliders will be recovered.

Leg 2 (March 26-28)
Much like the Fall 2012 cruise aboard the R/V Knorr, a control volume survey will again be carried out within a defined area of the SPURS study site. This control volume is a relatively small area of ocean that is representative of the study site. The survey will operate in a triangle around the WHOI mooring with UW-CTD, and microstructure profiling and CTD stations at the corners of the triangle. A series of Wave Gliders and a ML (Mid-Layer) float will be deployed during this leg.

Example of an Underway CTD (UW-CTD) instrument setup (photo courtesy of COSEE-OS).

Example of a surface mooring used in the SPURS cruise (photo courtesy of NASA).

Leg 3 (March 29-April 3)
This leg of the cruise will be focused on the deployment of a T-Glider with ASIP near the WHOI mooring. This will be carried out in conjunction with crew aboard the R/V Sarmiento. Vertical Micro-structuring Profile (VMP) time-series are to be carried out in the area.

Leg 4 (April 3-8)
The last project that the Endeavor and the scientists aboard will be involved with while on this cruise will be to identify salinity frontal features with input from satellites, models and a separate survey conducted by the R/V Sarmiento. Scientists will also deploy the T-Glider with ASIP for several day time-series. This leg of the cruise will see both vessels working together to survey the SPURS study site. The steam back to Narragansett, Rhode Island will begin on April 7, after a recovery of T-Gliders, a final check of moorings, and a few final CTD casts.

The Slocum Glider provides a way for scientists to survey upper-ocean hydrographic and microstructure variables (photo courtesy of WHOI).

Surface drifters measure salinity, temperature, air pressure, wind speed, and direction. They are able to track currents at depths up to 100m (photo courtesy of WHOI).

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R/V Sarmiento de Gamboa Cruise Details

Leg 1 (March 22-25)
During their week long steam to the study site, the crew of the Sarmiento will be performing test deployments of instruments (including CTD, SeaSoar, Apex and ASIP [Air-Sea Interaction Profiler] floats), calibrating the ADCP and deploying the CTD + rosette for data and water samples at various depths (0-2000 meters). Upon reaching the SPURS cruise site on March 22, the crew will immediately begin the SeaSoar mesoscale survey for 3 days, with a brief interruption on March 25 as they approach the WHOI mooring. On this day, several buoys will also be deployed (ASIP, Surpact, Apex).

Leg 2 (March 26-28)
On March 26, the SeaSoar survey will conclude, and a deployment of 18 surface drifters will begin in a squared-box formation within the SPURS site to study features associated with ocean fronts that the SeaSoar survey will have detected previously. The following day (March 28) the Sarmiento will visit the WHOI mooring to recover buoys deployed on the 25th (ASIP, Surpact, Apex) and more surface drifters will be deployed. Finally for this leg, CTD casts will be completed down to 700m at various points within the SPURS site to get information on the surface and subduction waters and the remaining surface drifters will be released.

Example of a SeaSoar apparatus. This instrument, when towed from a research vessel, is capable of measuring temperature, conductivity and various other oceanographic parameters in the upper ocean (photo courtesy of WHOI).

APEX (Atonomous Profiling Explorer) floats are autonomous drifting profilers and are used to measure subsurface currents and make profile measurements (photo courtesy of WHOI)

Leg 3 (March 29-April 3)
By March 29, all surface drifters will have been deployed and the crew of the Sarmiento will continue the SeaSoar mesoscale survey in the southern part of the SPURS study area.

Leg 4 (April 3-8)
Submesoscale measurements on specific sites identified during the mesoscale survey will begin and run from April 3-8. One of these samplings will be ASIP close to a WHOI turbulence glider that is currently in operation in the SPURS study site. The Endeavor will meet up with the Sarmiento for this experiment and both vessels/crew will coordinate joint data analysis to come up with a final strategy for the measurements acquired during Leg 4.

April 8 will conclude operations in the SPURS study site and the team onboard the R/V Sarmiento will begin their transit to the Azores. The crew will dock in Ponta Delgada on or around April 13 and the Sarmiento will return to Vigo (NW Spain mainland), where equipment and samples will be unloaded and processed.

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